

REMARKS

In accordance with the foregoing, the specification has been amended to improve form and provide improved correlation with the drawings and claims. Claims 2, 13, 16 and 18 have been amended, claim 17 has been cancelled without prejudice or disclaimer, and new claims 28 – 34 are added to the application. No new matter is presented in this Amendment.

CORRECTION OF MINOR INFORMALITY

The specification at pages 5 and 6 and claims 2 and 13 are amended to correct minor informalities noted by the Examiner at page 2 of the Office Action.

REJECTIONS UNDER 35 U.S.C. §102:

Rejection of claims 1 – 14 and 16 - 27 under 35 U.S.C. §102(a) and (e) over Kim et al.

Claims 1 - 14 and 16 - 27 were rejected under 35 U.S.C. §102(a) and (e) as being anticipated by Kim et al. (U.S. Pre-Grant Publication No. 2003/0073005).

The Examiner alleged that Kim et al. is directed to a lithium-sulfur battery comprising an electrolyte having a lithium imide salt and an organic cation salt. The Examiner noted that the Kim et al. has common inventors with the present application, but alleges that the published application would constitute prior art under 35 U.S.C. §102(e). For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

Applicants submit herewith a Request for Correction of Inventorship under 37 CFR 1.48(a) to add Yunsuk CHOI and Soo Seok CHOI as inventors of the subject matter. The Request is accompanied by the items set forth in 37 CFR 1.48(a). (Since two of the inventors, Seok Kim and Youngju Jung have not signed the supplemental declaration under 37 CFR. 1.63, but signed the original declaration, a petition under 37 CFR. 1.183 to waive the requirement that all of the inventors execute the new declaration is included herewith.)

Upon correction of the inventorship, the inventorship of the present application becomes the same as the indicated inventorship of the application published as U.S. Pre-Grant Publication No. 2003/007300. Therefore, the subject matter relied on by the Examiner was not known or used by others before the invention by the applicant according to 35 U.S.C. §102(a) and is not “by another” according to 35 U.S.C. §102 (e).

Accordingly, the rejection is thereby overcome.

Moreover, new claims 28 – 34, which depend from claim 22 and contain the same recitations regarding the electrolyte as claims 4, 2, 3, 10, 14, 16, and 19, respectively, should also be allowable.

Rejection of claims 1 – 14 and 16 - 20 under 35 U.S.C. §102(b) over Koch et al.

Claims 1 - 14 and 16 - 20 were rejected under 35 U.S.C. §102(b) as being anticipated by Koch et al. (U.S. 5,827,602). The Examiner alleged that Koch et al. is directed to an electrolyte for a nonaqueous battery and that the electrolyte comprises a molten organic salt and an organic solvent. The Examiner further alleged that the molten salt may comprises cations such as EMI and DMPI and may further comprise a lithium imide salt. The Examiner further alleged that the organic solvent may comprise a number of solvents including dioxolane and dimethoxyethane. The Examiner took the position that the recitation “for use in a lithium-sulfur battery” in the preambles of claims 1, 4 and 20 is given little patentable weight as reciting a future use. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

The independent claims 1, 4 and 20 are directed to an electrolyte for use in a lithium-sulfur battery, comprising salts having imide anions. Koch et al, on the other hand, describes an ionic liquid and mentions that its ionic liquid can be used in non-aqueous batteries. The specific examples in Koch et al. relating to batteries (Examples VI and VII) describe only lithium ion batteries, and the reference does not mention lithium sulfur batteries. Contrary to what is alleged by the Examiner, the recitation “for use in a lithium-sulfur battery” in the preamble of claims is not merely a recitation of future use, but provides a physical limitation. In particular, electrolytes for lithium ion batteries and electrolytes for lithium-sulfur batteries are not interchangeable and differ in composition. Therefore, the recitation “for use in a lithium-sulfur battery” serves to limit the claims to electrolytes having a composition to function in lithium-sulfur batteries. Therefore, claims 1 – 14, 16 and 18 – 20 are patentable over Koch et al.

Separate argument for patentability of claims 16 and 18 - 19

Claims 16 and 18 – 19, as amended herein, provide that the electrolyte further comprises an organic solvent in which the salt or salts are mixed and provides that the organic solvent comprises at least two groups selected from a weak polar solvent group, a strong polar solvent group and a lithium protecting solvent group. As described at pages 7 and 8 of the specification, the requirement of at least two groups of solvents selected from a weak polar solvent group, a strong polar solvent group and a lithium protecting solvent group is directly related to the

physical requirements for a solvent for a lithium-sulfur battery. Koch et al, on the other hand, merely provides a list of solvents that may be used in an electrochemical cell and does not teach or suggest at least two groups of solvents selected from a weak polar solvent group, a strong polar solvent group and a lithium protecting solvent group. Accordingly, claims 16 and 18 – 19 are patentable over Koch et al for this additional reason.

Therefore, this rejection should be withdrawn.

REJECTIONS UNDER 35 U.S.C. §103:

Rejection of Claim 15 under 35 U.S.C. §103(a) over Kim et al. or Koch et al.

Claim 15 was rejected under 35 U.S.C. §103(a) as being unpatentable over Kim et al. or Koch et al. The Examiner acknowledged that the references do not expressly teach the respective molarities of the first and second salts as recited in claim 15, but alleged that a person skilled in the art would be motivated to adjust the relative quantities of each salt to affect conductivity and viscosity. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

As noted above, Kim et al. has been removed as a reference with respect to the claims of the present application.

Regarding, Koch et al., as noted above, this reference does not relate to an electrolyte for a lithium sulfur battery. As noted at page 7 of the present specification, the respective molarities of the first and second salts are selected to improve the characteristics of a lithium sulfur battery. Since Koch et al. does not teach any use of an electrolyte for a lithium sulfur battery, Koch et al. would not have provided any motivation or guidance for a person skilled in the art to modify salt concentrations to provide relative concentrations that improve the performance of a lithium sulfur battery. Therefore, claim 15 would not have been obvious over Koch et al.

Therefore, this rejection should be withdrawn.

PROVISIONAL REJECTION OF CLAIMS 1 – 17 UNDER THE JUDICIALLY CREATED DOCTRINE OF OBVIOUSNESS-TYPE DOUBLE PATENTING

At page 5 of the Office Action, the Examiner provisionally rejected claims 1 - 27 under the judicially created doctrine of obviousness-type double patenting in view of U.S. Patent

Serial No. 10/617,230

Docket No. 1567.1048

Application Nos. 10/096,663, 10/434,086 and/or 10/659,363. (U.S. Patent Application No. 10/096,663 is the same application published as U.S. Pre-Grant Publication No. 2003/0073005.) Since U.S. Patent Application Nos. 10/096,663, 10/434,086 and/or 10/659,363 have not yet been issued as patents, and since claims 1 - 27 of the instant application have not yet been indicated as allowable except for the obviousness-type double patenting rejection, it is believed that any submission of a Terminal Disclaimer or arguments as to the non-obvious nature of the claims would be premature. MPEP 804(I)(B). As such, it is respectfully requested that the applicant be allowed to address any obviousness-type double patenting issues remaining once the rejection of the claims are resolved and/or one of U.S. Patent Application Nos. 10/434,086 and 10/617,230 is indicated as being in condition for allowance and in view of the claims as presented herein.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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